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In support of Marine Corps Vision and Strategy (MCV&S) 2025 Task 1 to "Improve small unit leader ability to assess, decide, and act in a more decentralized manner," the USMC Training and Doctrine Command (TECOM) created the Small Unit Decision Making (SUDM) Initiative. One objective of the initiative is to develop a SUDM Assessment Battery to understand the development of decision making proficiency of infantry small unit leaders. The purpose of this report is to summarize previous work leading to the development of an Initial SUDM Assessment Battery and to highlight the development of two customized assessment instruments within the battery. The battery is based on a developmental model of maneuver squad leaders and on a multi-dimensional approach to determining decision making proficiency. An Initial SUDM Assessment Battery was developed from a literature review of available instruments and the creation of three custom instruments. Future usability testing of the custom instruments will be followed by a pilot study of the initial battery and finalization of the battery based on pilot study findings.

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Final Report for Base Contract: Development of the Initial Small Unit Decision Making (SUDM) Assessment Battery

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Abstract

In support of Marine Corps Vision and Strategy (MCV&S) 2025 Task 1 to "Improve small unit leader ability to assess, decide, and act in a more decentralized manner," the USMC Training and Doctrine Command (TECOM) created the Small Unit Decision Making (SUDM) Initiative. One objective of the initiative is to develop a SUDM Assessment Battery to understand the development of decision making proficiency of infantry small unit leaders. The purpose of this report is to summarize previous work leading to the development of an Initial SUDM Assessment Battery and to highlight the development of two customized assessment instruments within the battery. The battery is based on a developmental model of maneuver squad leaders and on a multi-dimensional approach to determining decision making proficiency. An Initial SUDM Assessment Battery was developed from a literature review of available instruments and the creation of three custom instruments. Future usability testing of the custom instruments will be followed by a pilot study of the initial battery and finalization of the battery based on pilot study findings.

Contents

Abstract ii
Figures iv
Tables iv
Executive Summary v
Introduction v
Method for Designing Custom Instruments v
Findings vii
Utilization of Findings vii
Introduction 1
Background 1
Multi-Dimensional Measurement of Decision Making 1
Maneuver Squad Leader Mastery Model 2
Review and Selection of Available Instruments 4
Usability Testing of Off-the-Shelf Instruments and BARS 6
Method for Developing Custom Instruments 8
The Situational Judgment Test 8
Background 8
Methodology 8
The Decision Requirements Interview 10
Background 10
Methodology 11
Results and Discussion 13
References 15
Appendix A: Operationalized Definitions and Examples of SUDM Competencies and CARS A-1

Figures

Figure 1. Constructs and Initial SUDM Assessment Battery Instruments..... 6

Tables

Table 1. TECOM Small Unit Decision Making Cognitive Competencies and CARS..... 2
Table 2. Nine Key Performance Areas for Maneuver Squad Leaders..... 3

Executive Summary

Introduction

The purpose of this report is to summarize the overall development of an Initial Small Unit Decision Making (SUDM) Assessment Battery for the U.S. Marine Corps (USMC) and to highlight the development of two customized assessment instruments within the battery. In support of Marine Corps Vision and Strategy (MCV&S) 2025 Task 1 to "Improve small unit leader ability to assess, decide, and act in a more decentralized manner," the USMC Training and Doctrine Command (TECOM) created the SUDM Initiative. One objective of the SUDM Initiative is to develop a SUDM Assessment Battery to understand the development of decision making proficiency of small unit leaders (in this case, Marines who are currently or who are expected to be assigned as rifle squad leaders or weapons section leaders, referenced collectively throughout this document as maneuver squad leaders) and provide insight into the impact of efforts to improve proficiency. To address this requirement, the first step was to create a developmental model for maneuver squad leaders. The purpose of this model was to form a foundation for understanding the general progression to mastery as a maneuver squad leader, including the progression of decision making proficiency. Following development of this model, our research team selected a number of relevant instruments from the literature for measuring constructs supporting decision making proficiency, identified gaps in instruments available, and developed custom instruments to form the Initial SUDM Assessment Battery for future pilot testing.

The SUDM Assessment Battery is based on a multi-dimensional approach to determining proficiency in decision making. Multi-dimensional is defined as addressing multiple constructs in the assessment battery, which when taken together, inform our understanding of an individual's decision making proficiency. During the previous work conducted by our research team to identify existing instruments that address the dimensions or constructs that are part of decision making proficiency, we determined that some of the constructs which the USMC seeks to measure cannot be addressed by off-the-shelf instruments. Limitations include a simple lack of instruments for the construct, inappropriateness of available instruments for the target audience, and a predominance of self-report instruments found in the literature as opposed to assessments that require performance-based responses which we concluded were warranted for some constructs.

Method for Designing Custom Instruments

This portion of the SUDM Assessment Battery project was focused on custom development of two performance-centered assessment instruments—a Situational Judgment Test (SJT) and a Decision Requirements Interview (DRI). The SJT scenario-based items were derived from critical incident data obtained during mastery model interviews. In-house subject matter expert (SME) review, as well as comparison to the constructs TECOM seeks to measure, resulted in an initial version of 25 items. Future usability testing will support finalization of the items and provide the foundation for determining response format and scoring criteria for each item.

Each SJT item consists of a brief scenario with four possible courses of action. The scenarios and courses of action are based on real life experiences from SMEs interviewed as part of the mastery model development. Interviewees were asked to describe situations where they (or someone else) had to face a difficult problem and ways a squad leader at different levels of proficiency would respond. The incidents were used as a framework for developing scenarios that measure the cognitive competencies and CARS. Scenarios were further edited to ensure each item was of similar length and format (McDaniel & Nguyen, 2001). A readability analysis was conducted to verify that the language would not add an unnecessary cognitive load on the examinee.

To more comprehensively address the lack of a standardized measure for addressing the overall decision making construct, we generated the DRI, a new instrument based on the critical factors for good decision making. The factors include an individual's recognition and interpretation of relevant information and indicators from the environment, understanding of the complete goal set pertinent to the situation, and typical ways of apply tactical and technical skills to the situation to solve the tactical dilemma (e.g., Klein, 1998). Our primary objective in developing the DRI was to produce a technique that is not reliant on SME ratings, allows for multiple acceptable courses of action (COAs), enables differentiation between acceptable and superior decision making, and bases ratings on an individual's thought process and rationale rather than the outcomes of his performance.

The DRI was conceptualized as an interview technique consisting of a tactical scenario with a series of events requiring respondents to make sense of the events and decide upon a COA for each event. The administration protocol includes question sets to elicit the respondents' understanding of the situation and considerations for decision making, and a Decision Requirements Table (DRT) to record those considerations during the interview. The resultant DRT would then be scored against a master DRT; points would be awarded for noticing and correctly interpreting relevant cues, considering important factors, identifying goals to be achieved, and selecting a workable COA.

The scenario selected was originally constructed for implementation in a combined live and virtual training facility, across five training days where a new fragmentary order was provided at the start of each training day. We selected a subset of the scenario events to include in the DRI scenario, and then reconstructed it into a paper-and-pencil scenario consisting of five segments. Events were selected with the goal to represent a range of operational decision types and performance areas from the Maneuver Squad Leader Mastery Model. Perceptual cues and indicators originally presented via live or virtual scenario events were re-written for introduction in text and images. A mission order and fragmentary orders were created to ensure respondents understood the mission, the operational context, friendly and enemy situations, unit tasks, and assets available.

The scenario consists of five segments, each requiring responses from the participant. The DRT framework for collecting responses is built around six categories of decision requirements to be understood for each segment:

- The dilemma, decision point, problem, or issue requiring a decision

- Perceptual cues recognized as relevant and interpreted to support effective decision making
- Background factors recognized as relevant and considered when making the decision
- The decision or course of action made by the participant in response to the dilemma
- Common errors associated with making the decision
- Job knowledge applied when making the decision

Findings

A version of the Initial SUDM Assessment Battery (Ross, Vogel-Walcutt, & Phillips, 2012) was created from the literature review and the custom instruments (BARS, SJT, and DRI). It contains 27 instruments addressing 15 of the 17 constructs (excepting anomaly detection and change detection, still under investigation). This version is subject to usability testing of the SJT and the DRI to be carried out under Option 1 of the contract. Furthermore, it will be assessed during the conduct of a pilot study and modified according to pilot study findings.

Utilization of Findings

Usability testing of the SJT is to be conducted at Camp Lejeune, North Carolina, with six SMEs to determine appropriateness, face validity, and clarity of the items. Each participant will be provided a test booklet that includes SJT items on separate pages with instructions and space for correcting each item. After the usability testing, the item response format will be developed. Answers scored as appropriate will be based on SME feedback and ranking from the usability testing. The final set of SJT items will consist of SME validated scenarios and items developed according to guidelines in the scientific literature.

The DRI will be subjected to usability testing with six Sergeants representing the target audience. The protocol will be administered to judge the clarity of the scenario and question sets, the protocol's ability to elicit the desired elements of cognitive performance and decision considerations, and the researchers' ability to construct the DRT during the course of an interview. Following usability testing, the scenario, question sets, and DRT framework will be modified as needed to increase the utility and ease of use of the DRI as a performance-based measure of decision making. Once this interview technique is modified to a point that its administration can be standardized and it reliably captures decision performance data as desired, our goal will be to modify its implementation for use with any high-quality tactical scenario and for administration by non-researchers.

Following usability testing of the SJT and DRI instruments and instrument revision, the pilot study will commence. The study will consist of five administrations of the battery as well as completion of subjective surveys by participants and their supervisors. The administrations will be conducted prior to the cohort of students entering their Advanced Infantry Courses, prior to entry into the new Infantry Small Unit Leader Course (ISULC), at the conclusion of ISULC, 6 months after assignment to a billet, and 12 months after assignment. The purpose of the data collection is to pilot test the battery, and simultaneously, battery development will continue as off-the-shelf measures are reduced in number, custom instruments are refined, and additional

instruments are identified or developed to fill gaps or better address constructs than do initial instruments. Some changes to improve efficiency and effectiveness will be introduced during the pilot, but a core of measures will be maintained across the pilot administrations to insure consistent repeated measures to support validity of insights regarding development over time. Some changes in the battery resulting from analysis of the pilot data will be introduced only after the pilot is completed and the SUDM Assessment Battery is finalized.

Once pilot testing is underway, we expect that additional gaps may emerge in the battery. For those areas where the currently available scales are too cumbersome, the results are not useful for informing training practices, or where no scale assesses the full scope of a construct, new, military-targeted scales may need to be developed and/or measures being developed under other efforts encompassing the constructs must be identified to fill the gaps.

We recommend that versions of the actual battery be restricted to official use by the research community only. Knowledge of the items which can be the subject of discussion among potential instructors and student participants in the subsequent pilot testing can invalidate the findings.

Introduction

The purpose of this report is to summarize the overall development of an Initial Small Unit Decision Making (SUDM) Assessment Battery for the U.S. Marine Corps (USMC) and to highlight the development of two customized assessment instruments within the battery. The SUDM Assessment Battery is based on a multi-dimensional approach to determining proficiency in decision making for Marines who are currently or who are expected to be assigned as rifle squad leaders or weapons section leaders, referenced collectively throughout this document as maneuver squad leaders. Multi-dimensional is defined as addressing multiple constructs in the assessment battery, which when taken together, inform our understanding of an individual's decision making proficiency. Previous work conducted by our research team to develop the initial version of the assessment battery resulted in the identification of a number of existing instruments that address the dimensions or constructs that are part of decision making proficiency. This process is summarized below. Our team also determined that some of the constructs which the USMC seeks to measure cannot be addressed by off-the-shelf instruments. Limitations include a simple lack of instruments for the construct, inappropriateness of available instruments for the target audience, and a predominance of self-report instruments found in the literature as opposed to assessments that require performance-based responses which we concluded were warranted for some constructs. This portion of the project was focused on custom development of two performance-centered assessment instruments—a Situational Judgment Test (SJT) and a Decision Requirements Interview (DRI).

Background

In support of Marine Corps Vision and Strategy (MCV&S) 2025 Task 1 to "Improve small unit leader ability to assess, decide, and act in a more decentralized manner," the USMC Training and Doctrine Command (TECOM) created the SUDM Initiative. One objective of the SUDM Initiative is to develop a SUDM Assessment Battery to understand the development of decision making proficiency of small unit leaders and provide insight into the impact of efforts to improve proficiency. To address this requirement, the first step was to create a developmental model for maneuver squad leaders. The purpose of this model was to form a foundation for understanding the general progression to mastery as a maneuver squad leader, including the progression of decision making proficiency. Following development of this model, our research team selected a number of relevant instruments from the literature for measuring constructs supporting decision making proficiency, identified gaps in instruments available, and developed custom instruments to form the Initial SUDM Assessment Battery for future pilot testing.

Multi-Dimensional Measurement of Decision Making

Based on a series of workshops and surveys of Marine Corps leaders, Marine Corps subject matter experts (SMEs), and leading researchers, it was hypothesized that five cognitive competencies and ten cognitive and relational skills (CARS) support maneuver squad leader performance and decision making (U. S. Marine Corps, 2011). The competencies and CARS are depicted in Table 1 below. The SUDM Assessment Battery is designed to measure each of the 15 competencies and CARS; overall decision making proficiency; and level of mastery for maneuver squad leaders. The SUDM Assessment Battery addresses these 17 constructs.

Continued work as the battery is further developed may reveal relationships among these constructs that allow for the consolidation of constructs into a smaller number of dimensions that indicate decision making proficiency.

Table 1. TECOM Small Unit Decision Making Cognitive Competencies and CARS

Cognitive Competencies	Cognitive and Relational Skills (CARS)	
Sensemaking	Cognitive Flexibility	Analytical Reasoning
Adaptability	Resilience	Perspective Taking
Problem Solving	Anomaly Detection	Ambiguity Tolerance
Metacognition	Change Detection	Self-Awareness
Attentional Control	Situational Assessment	Self-Regulation

Maneuver Squad Leader Mastery Model

To support improvements in assessment, as well as training and experience for maneuver squad leaders in support of decentralized operations in the 21st century hybrid threat environment, we developed a Maneuver Squad Leader Mastery Model (Ross, Phillips, Rivera, Brown, & Smith, 2012). The model describes the developmental path to expertise for rifle squad leaders and weapons section leaders. The five-stage descriptive model contains key performance areas, performance indicators at different stages of development, and linkages to the decision making competencies and supporting CARS for small unit leaders that were previously identified by TECOM. The model is designed to (1) provide insights into how individuals progressively develop into high performing maneuver squad leaders, and (2) provide implications for what should be assessed and how during development. These insights support potential actions to improve cognitive readiness with individual, unit, and organizational enhancements.

TECOM requested experienced Infantry NCOs (Noncommissioned Officers) and Officers from five organizations to participate in interviews and share their knowledge, experiences, and insights into the key performance areas for maneuver squad leaders and the path to development for mastery of this billet. Interviews serving as the basis for this report were conducted at School of Infantry–East (SOI-E), School of Infantry–West (SOI-W), 1st Marine Division, 2nd Marine Division, and with members of two Reserve battalions preparing for deployment as a Mobile Training Team. Participants included a total of 58 Marines. Twenty of the participants were serving in Infantry instructor billets, 28 were serving in Infantry billets in the operational forces, and ten were Reservists preparing to be instructors. All participants contributing to the Mastery Model had recent combat experience except for one, who had Marine Expeditionary Unit deployment experience to various countries.

The interviews contained over 874 references to behavioral indicators and other descriptors of the maneuver squad leader as development progressed through five levels of learning and performance—novice, advanced beginner, competent, proficient, and expert (Dreyfus, & Dreyfus, 1986). The descriptors were separated by card sort into the nine key performance areas by stage of development in the model. The nine areas and definitions are shown in Table 2.

Profiles of performance in each area, for each stage of development, were developed. Each performance area was linked to the competencies and CARS, with one to many relationships found across performance areas (Ross et al., 2012).

Table 2. Nine Key Performance Areas for Maneuver Squad Leaders

Key Performance Area	Definition
Adaptability/Flexibility	The ability to fluidly apply knowledge and tactical principles across situations, or alter one's plans, actions, or decisions when the situation, environment, or circumstance has changed, while still accomplishing the mission or intent.
Administration	The coordination and supervision of people, processes, and equipment in conjunction with the abilities to multitask and delegate assignments.
Character, Initiative, and Command Presence	The mental, physical, and character traits of an effective leader who demonstrates confidence, sets a positive example, garners respect and trust from his subordinates, takes full responsibility for his own actions, and accomplishes tasks and goals autonomously within intent.
Communication	Effectively obtaining, relaying, and explaining information to subordinates, superiors, and adjacent squad or section leaders in order to direct actions or maintain shared understanding.
Job Knowledge	The comprehension of procedures, processes, and asset capabilities required to effectively perform the maneuver squad leader role.
Self-Control and Stress Management	Managing and regulating one's emotional responses, control, and stability in order to prioritize and perform effectively within high stress contexts.
Self-Development	The motivation to continuously acquire and apply new knowledge, skills, and lessons learned to current role requirements and future professional development goals, as a result of an attentiveness to the nature of one's self, personal strengths, limitations, and work styles.
Tactical Skills/Tactical Thinking	The cognition required to apply tactical, technical, and team knowledge to analyze mission requirements, plan, solve tactical problems, and execute the mission decisively, within the big picture and Commander's intent.
Train, Mentor, and Develop Marines	Continuously caring about and fostering the professional and personal development of subordinates, by teaching, training, coaching, building trust, assessing skills and personalities, and providing guidance.

Analysis of data collected for the Mastery Model interviews informed a richer understanding of how competencies and CARS reveal themselves in a maneuver squad leader's actions. Definitions of these constructs previously derived from the research literature were compared with incidents describing actual maneuver squad leader experiences and decisions from the interviews. The competency and CARS definitions initially derived from the literature were then

operationalized to accurately reflect the application of the cognitive constructs to maneuver squad leader performance on the job. Incident examples for each construct illustrate how maneuver squad leaders apply the competencies and CARS in operational or garrison contexts. These operational construct definitions will improve measurement efforts targeting decision making skills, by increasing the specificity of the desired measurement. The definitions and examples are presented in Appendix A.

The Maneuver Squad Leader Mastery Model codifies the qualities and desired performance that must be considered each time a maneuver squad leader is selected, each time an educational program is instituted, and each time a training plan or initiative is developed. It describes the developmental progression of the small unit leader, to inform training that will accelerate cognitive readiness and approaches that will accurately measure cognitive performance. The interviewees responsible for selecting, training, and developing the maneuver squad leader have an innate understanding of the person they are looking for to fill that billet and how that person can reasonably be expected to develop in that role. Capturing their knowledge and experience in the model allows leaders at all levels and the training and education community access to their insights with a comprehensive and documented description of the performance demands and requirements for success.

The Mastery Model also forms the basis from which to measure level of mastery of the maneuver squad leader job. Following the development of the model, a Behaviorally Anchored Rating Scale (BARS) was developed to address the construct of maneuver squad leader mastery. A BARS instrument pairs observable behaviors with numeric ratings of performance (Muchinsky, 2003). The initial BARS for maneuver squad leader mastery focuses on tactical thinking. Of the 874 references to performance descriptors in the data, tactical thinking skills were mentioned with the highest frequency of the nine key performance areas. The BARS instrument matches behavioral indicators elicited as part of the Mastery Model development with the five levels of learning and performance, from novice to expert. As a result, observable behaviors related to squad leader tactical thinking can be rated as indicative of performance at the novice, advanced beginner, proficient, competent, or expert level of mastery.

Review and Selection of Available Instruments

To support the development of the initial battery, we conducted a meta-review of research-supported assessment methods for the remaining 16 constructs (all competencies and CARS, and the general skill of decision making) and made recommendations for potential "off-the-shelf" instruments to include in the battery for this population. The meta-review was conducted simultaneously with model development. Initial definitions obtained from the literature were used to guide both this review of the literature and subsequent development of operational definitions that resulted from model development as noted above. The definitions obtained from the literature and a description of the instruments retained and included in the Initial SUDM Assessment Battery can be found in Vogel-Walcutt, Ross, Smith, & Brown (2012).

A meta-review of the extant literature for each identified construct was conducted. Specifically, a preliminary investigation of internet resources at large (e.g., databases, search engines, military reports) was conducted yielding 25 possible assessments (Review Round I). An additional systematic search of the Google Scholar® database was conducted (Review Rounds II & III).

For this search, each of the 16 identified constructs was paired with one of five qualifiers (scale, assessment, inventory, review, and meta-analysis) yielding 80 combinations of search terms. For each set of terms, the 100 most relevant articles published between 1980 and 2012 were considered. To be further reviewed, articles had to note either a specific scale that assessed the construct or be identified as a review or meta-analysis of several articles that reviewed the nature, training, or assessment of the skill. In the next phase, each article was reviewed to determine if the scale noted was likely to be (a) military relevant, (b) age appropriate, (c) usable with normal populations (e.g., not for patients with brain traumas), and (d) readily available. Finally, articles were required to supply the assessment tool in the article, leaving 101 that could be easily obtained. Combining Round I and II results, 126 total articles were considered for scale review. During Round III, the remaining scales were obtained and assessed using the same criteria noted above. Fifteen were retained from this round, bringing the total reviewed to 141. Each of the possible assessment tools was analyzed to determine if they met several criteria: empirically validated, time to complete, ready-to-use, administrator (self, researcher, and instructor), military focus, training specific (is the training program expected to affect scores on this assessment?), and quantitative/qualitative (is the test quantitative or qualitative in nature?). A total of 44 scales were retained following this analysis.

Once this final set of acceptable scales was identified, it was necessary to reduce the number of included scales to increase administration efficiency and reduce redundancy. Therefore, a team of scientists reviewed each of these scales in-depth considering primarily their relevance to the military and their construct validity as it pertains to the military's needs. From this final analysis, the preliminary set of scales was solidified. Specifically, scales were excluded because they lacked military relevance, did not represent the construct as was defined by our review, and/or were redundant to other scales that tested the same construct. Additionally, several scales were transferred to a different construct category than originally classified due to individual scale items better matching the updated construct definitions.

Twenty-seven scales were retained for the final version of the Initial SUDM Assessment Battery (see Figure 1). *Additional review and possible construction of scales or performance tests will be needed for anomaly detection, and change detection*. Assessment instruments developed in house for level of mastery, overall decision making, situational assessment, and sensemaking are also shown in the figure.

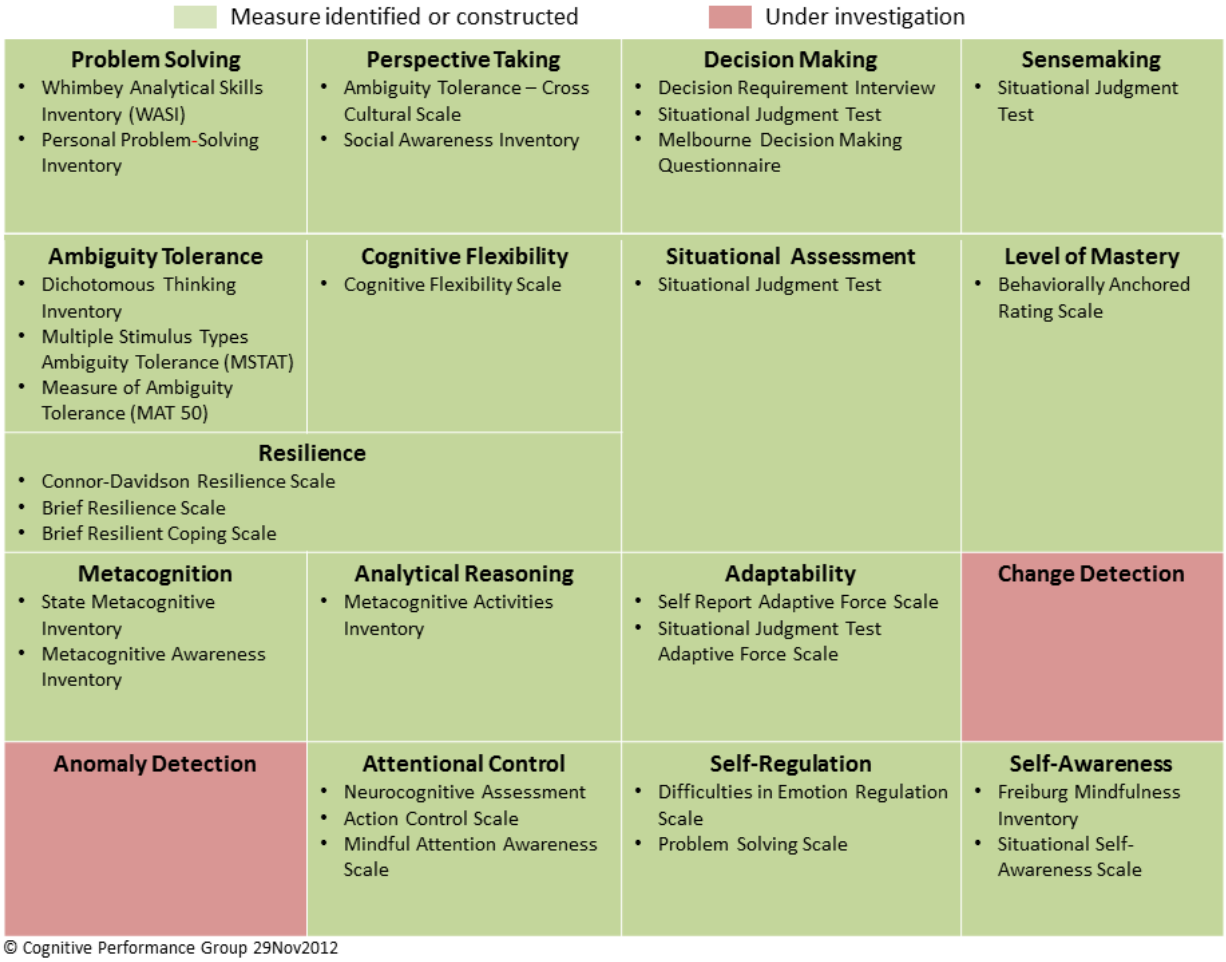

Figure 1. Constructs and Initial SUDM Assessment Battery Instruments

Usability Testing of Off-the-Shelf Instruments and BARS

Two rounds of usability testing (Phillips, Vogel-Walcutt, & Lenhoff, 2012) were conducted. The first round of testing was conducted in October 2012. Its purpose was to examine the ease of use and time required for completion of the off-the-shelf instruments identified as candidates for the SUDM Assessment Battery Pilot Study. The second round of testing was conducted in November 2012. The purpose of the second round of usability testing was to examine the utility of the BARS instrument, specifically the goodness of the BARS scenario and its ability to capture variability in performance.

For Round One, six sergeants from Lima Company, 3rd Battalion, 25th Marines, based in Columbus, Ohio, were recruited for participation by TECOM. All participants were Infantry reservists with 0311 (rifleman) Military Occupational Specialties (MOSs). Each had served in a squad leader billet. All Round One participants completed all the off-the-shelf tests and for each test, they completed a short survey. For Round Two, six sergeants from the School of Infantry-East based at Camp Lejeune, North Carolina, were identified as fitting the criteria and recruited

for participation by the Advanced Infantry Training Battalion-East (AITB-E). All participants were instructors at SOI-E. They represented 0311, 0331 (machine gunner), and 0341 (mortarman) MOSs. Each had served in a squad or section leader billet. All Round Two participants were interviewed using the BARS protocol and provided scenario feedback during the course of the interview.

A subjective assessment of the usability test participant feedback suggests two of the off-the-shelf instruments tested are potentially problematic as Assessment Battery candidates: (1) the Neurocognitive Assessment (Attentional Control construct) and (2) the SJT Adaptive Force Scale (Adaptability construct). These instruments were the only measures judged to be difficult to understand by the majority of the three participants completing them, as indicated by ratings related to instruction/question clarity, or additional comments suggesting confusion or trouble interpreting the response choices. Additional feedback will be collected during a future usability testing session for the SJT Adaptive Force Scale. The Neurocognitive Assessment scale will be assessed during the conduct of the pilot study. The results of these additional feedback activities will inform a future decision as to whether to drop these instruments.

Each BARS Interview session lasted between 35 and 45 minutes. As to the question of scenario realism and clarity, participants reported the scenario to be sound and accurate; no revisions would be necessary to ensure depiction of a sufficient mission statement, a realistic background situation, or a relevant tactical situation. As to the question of whether the pause-point queries effectively elicited decisions, rationale, priority, concerns, and courses of action, all participants reported the ability to answer the questions without issue. During the course of the testing, the interviewers tested out the addition of five questions at the final pause point, and found those questions to be valuable for eliciting additional information as to participant tactical thinking. The new questions were:

- What orders would you give your team leaders?
- What are your tactical advantages?
- What are your tactical disadvantages?
- Is there additional information you would seek at this time?
- What do you believe will happen next?

Interviewers found the question “What are your questions?” to fit the flow of the questioning in only one of the six instances, and therefore decided to eliminate it from future iterations.

As to the question of whether the scenario was likely to produce variation in responses as a result of respondent proficiency level differences, participants reported the scenario to be too simple. Several resolutions were suggested, and the following will be implemented prior to commencement of the pilot study:

- Assign the respondent to be the main effort vice the supporting effort.
- Include more civilians in the streets who would be in the line of fire.
- Include structures of varying height, to prompt additional decisions about how to use the terrain.

- Do not color the structures on the map green, indicating to participants that they are cleared and secure, which is antithetical to the scenario text.

Method for Developing Custom Instruments

The Situational Judgment Test

Background

Situational Judgment Tests (SJTs) are measurement tools that are typically designed to assess knowledge, skills, cognitive abilities, values, and attitudes. They consist of job-related scenarios that describe a dilemma requiring individuals to apply key knowledge, skills, and abilities (KSAs) in order to interpret, judge, and respond to the item. Studies using meta-analysis techniques have shown SJTs to have superior validity over traditional performance measurement techniques (McDaniel, Hartman, & Grubb, 2003; McDaniel, Morgeson, Finnegan, Campion, & Braveman, 2001). For this reason, an SJT was deemed suitable for measuring the cognitive competencies and CARS that support maneuver squad leader performance areas and decision making. The specific constructs measured with the SJT include sensemaking, situational assessment, and overall decision making; no standardized measures were identified as part of the literature review for these three constructs.

Methodology

Development of the SJT consisted of four phases with Phases 3 and 4 still in progress. Phase 1 involved converting results from the critical incident section of the mastery model interviews to scenarios. Phase 2 required in-house SMEs to review and finalize the draft scenarios and responses. Following SME review, usability testing will be conducted in Phase 3. In Phase 4, the response format for each item will be determined.

Phase 1: Scenario and Response Choice Development

Each SJT item consists of a brief scenario with four possible courses of action. The scenarios and courses of action are based on real life experiences from SMEs interviewed as part of the mastery model development. The situations were developed from critical incidents revealed during the interviews. Interviewees were asked to describe situations where they (or someone else) had to face a difficult problem and ways a squad leader at different levels of proficiency would respond. The incidents were used as a framework for developing scenarios that measure the cognitive competencies and CARS. Scenarios were further edited to ensure each item was of similar length and format (McDaniel & Nguyen, 2001). A readability analysis was conducted to verify that the language would not add an unnecessary cognitive load on the examinee. A total of 25 items were developed for review.

Phase 2: SME Review

In Phase 1, scenarios were constructed from the interviewees' incident reports, but changes were made to the events to ensure the cognitive competencies and CARS of interest were being measured. Due to these changes from the original incidents, it was necessary to undergo a

preliminary in-house SME review prior to usability testing. The purpose of the in-house SME review was to ensure that modifications to the scenarios did not affect the realism and feasibility of the situations. Two SMEs were asked to review all scenarios and response choices and determine whether they still addressed the key elements of the original story. Feedback from the SMEs was evaluated and incorporated to finalize the 25 SJT items.

Phase 3: SJT Usability Testing

Usability testing is to be conducted at Camp Lejeune, North Carolina, with six SMEs to determine appropriateness, face validity, and clarity of the items. Each participant will be provided a test booklet that includes SJT items on separate pages with instructions and space for correcting each item. For each item the SMEs will be asked to answer the following questions:

1. Does the scenario portray something that could realistically happen? If not, what change would you make?
2. Are the response options provided realistic? If not, what would you change? It may help to consider what you would do in that scenario.
3. Please rank the response options from best to worst answers.

Once the test booklets are completed and returned, the responses will be analyzed and final revisions will be completed. The ranking of the response choices will be used to develop the response format and scoring technique.

Phase 4: Item Response Format

After the completion of Phase 3, the item response format will be developed. Three response formats are being considered: (1) Multiple-choice, which requires the selection of an action or interpretation as appropriate/inappropriate (Motowidlo, Dunnette, & Carter, 1990); (2) Likert scales, which require the assessment (e.g., the effectiveness of each action or interpretation) of each response option in the scenario (Wagner & Sternber, 1985; Legree, Heffner, Psotka, Mesker, & Martin, 2003); (3) Open-ended responses, which are more difficult to analyze but allow the participants to freely write-in their actions or interpretations (Psotka, Streeter, Landaver, 2004).

Answers scored as appropriate will be based on SME feedback and ranking from Phase 3. Scoring guide and techniques will be developed once the response format has been finalized. Scoring techniques may range from statistical analysis for the Likert and multiple-choice options to qualitative analysis for the open-ended responses. The final set of SJT items will consist of SME validated scenarios and items developed according to guidelines in the scientific literature.

The Decision Requirements Interview

Background

To more comprehensively address the lack of a standardized measure for addressing the overall decision making construct, we generated a new instrument called a Decision Requirements Interview (DRI).

Decision making performance is difficult to measure objectively, especially in ill-structured, cognitively complex domains such as small unit leadership. These domain types are characterized, almost by definition, as allowing for multiple decisions that will satisfy the requirement given a real world dilemma (e.g., Klein, 1998). The existence of many correct answers complicates the goal of assessing performance in any standard manner. In the past, researchers have had some success using SME ratings to gauge the acceptability of an individual's course of action (COA) in response to a tactical dilemma, thereby enabling some degree of measurement of decision performance. However, SMEs are not always readily available, and variability exists often across SME judgments of quality due to differences in their past experiences (e.g., McCloskey, Pliske, Klein, Heaton, & Knight, 1997; Pliske, Militello, Phillips, & Battaglia, 2001).

Attempts to focus on outcome measures to judge decision performance, such as mission accomplishment, casualties, or number of kills, are likewise problematic. The determination of meaningful outcome measures is not always straightforward. For example, a desired outcome may be to reach an objective or collect on an information requirement within an allotted amount of time. However, this measure does not account for the manner in which the outcome is achieved. Often a number of process measures must also be identified to take into account the full range of mission goals, such as building collaborative relationships with local populations or host nation forces or addressing threats as they become apparent. Furthermore, achievement of a desired outcome is sometimes attributable to good fortune or decisive execution of a mediocre decision, vice a well-conceived COA. The reverse can also be true: a strong COA can fail to meet the desired outcomes for reasons that are beyond the control of the respondent. For these reasons, measuring decision skill based solely on desired outcomes does not always produce a reliable assessment.

The critical factors for good decision making include an individual's recognition and interpretation of relevant information and indicators from the environment, understanding of the complete goal set pertinent to the situation, and typical ways of apply tactical and technical skills to the situation to solve the tactical dilemma (e.g., Klein, 1998). Our primary objective in developing the DRI was to produce a technique that is not reliant on SME ratings, allows for multiple acceptable COAs, enables differentiation between acceptable and superior decision making, and bases ratings on an individual's thought process and rationale rather than the outcomes of his performance. To do so, we drew on the practice of Cognitive Task Analysis (CTA).

The CTA suite of methodologies offers a means of identifying and describing cognitive tasks and demands associated with skilled performance in a domain (Crandall, Klein, & Hoffman, 2006). The cognitive performance elements are often captured from SMEs to model decision expertise

in the domain. The analysis outcomes can be used to design expert systems, to create training, or to design interfaces.

A decision requirements analysis is one technique for identifying and documenting the decisions and judgments required to perform a task or set of tasks within a domain, along with their associated cognitive requirements. It typically relies on critical incident data and decomposes a data set consisting of several incidents into the decisions and cognitive requirements common across the incidents. In a decision requirements analysis, the following cognitive elements are often delineated for each decision or judgment:

- Perceptual cues that are sensed – seen, heard, smelled, touched, or tasted – from the immediate environment and used to inform the decision.
- Background factors or knowledge held prior to the immediate situation and considered when making the decision. Common background factors for small unit leaders include the mission statement and commander's intent, intelligence about the enemy, and knowledge of the locals' pattern of life.
- Reasons why the decision or judgment can be difficult.
- Strategies or aspects of an individual's expertise applied to the decision.
- Goals or objectives associated with the decision, or what the decision maker is really trying to achieve by making the decision.
- Errors commonly made by inexperienced performers.

The outcome of a decision requirements analysis is a decision requirements table (DRT) in which these performance elements are listed for every decision or judgment.

By modifying the decision requirements analysis technique into the DRI, we are creating an elicitation and assessment tool that will similarly deconstruct the thought processes and rationale of study participants. The objective is to produce a better understanding of how and why individuals make certain decisions and judgments – what cues and factors inform decisions, what they are ultimately trying to achieve, and their understanding of potential performance errors. By capturing and examining the cognitive processes and rationale behind the decision, we can better assess the strength of the cognitive performance.

Methodology

The DRI was conceptualized as an interview technique consisting of a tactical scenario with a series of events requiring respondents to make sense of the events and decide upon a COA for each event. The administration protocol was to include question sets to elicit the respondents' understanding of the situation and considerations for decision making, and a DRT to record those considerations during the interview. The resultant DRT would then be scored against a master DRT; points would be awarded for noticing and correctly interpreting relevant cues, considering important factors, identifying goals to be achieved, and selecting a workable COA. Once this interview technique is modified to a point that its administration can be standardized and it reliably captures decision performance data as desired, our goal will be to modify its implementation for use with any high-quality tactical scenario, and for administration by non-researchers.

Phase 1: Scenario Selection and Modification

The DRI development began with the selection of a tactical scenario. Criteria for scenario selection included a series of events offering multiple opportunities for decision making; a range of possible decisions; moderate to high complexity; and relevance to a maneuver squad leader.

Pre-existing scenarios were identified and reviewed to select a scenario best matching the criteria. Two primary scenario sets were considered: a set of 12 Army platoon level decision-centered scenarios set in a Military Operations in Urban Terrain (MOUT) context (Phillips et al., 2001), and a set of two five-part Marine Corps squad level interactive decision-centered scenarios created for employment in the Infantry Immersion Trainer (IIT) at Camp Pendleton, California (Ross, Becker, & Lindsey, 2010). Ultimately, we selected the *Engagement at Jafarani* scenario, a rifle squad combat patrol set in Afghanistan, from the latter set of IIT scenarios.

The *Engagement at Jafarani* scenario was modified to meet the DRI objectives. The scenario was originally constructed for implementation in a combined live and virtual training facility, across five training days where a new fragmentary order was provided at the start of each training day. We selected a subset of the scenario events to include in the DRI scenario, and then reconstructed it into a paper-and-pencil scenario consisting of five segments. Events were selected with the goal to represent a range of operational decision types and performance areas from the Maneuver Squad Leader Mastery Model. Perceptual cues and indicators originally presented via live or virtual scenario events were re-written for introduction in text and images. A mission order was created from the *Engagement at Jafarani* mission and fragmentary orders to ensure respondents understood the mission, the operational context, friendly and enemy situations, unit tasks, and assets available.

Segment 1 of the scenario is receipt of the patrol order and requires individuals to plan and prepare the patrol mission. In Segment 2, participants must respond to a team leader who is still shaken up from a previous improvised explosive device (IED) event and a fire event by host nation forces on locals seen in the fields with a weapon. The third Segment takes place in the commercial sector of the village and includes indicators of suspicious behavior to which the individual must respond. In Segment 4, the participant conducts an information collection session with a local informant. Finally, in Segment 5, the participant must respond to indicators of a possible vehicle-borne IED. As a result of all five segments, respondents make decisions related to the following maneuver squad leader key performance areas: Tactical Skills/Tactical Thinking; Adaptability/Flexibility; Communication; and Job Knowledge.

Phase 2: Administration Protocol

The administration protocol consists of question sets at each of the five segment breaks and a DRT framework within which to record participant responses to the questions.

We began by constructing the DRT framework representing the response data to be collected. We identified the following typical DRT categories of data as pertinent to the DRI objectives:

- The dilemma, decision point, problem, or issue requiring a decision.

- Perceptual cues recognized as relevant and interpreted to support effective decision making.
- Background factors recognized as relevant and considered when making the decision.
- The decision made or COA taken by the participant in response to the dilemma.
- Common errors associated with making the decision.
- Job knowledge applied when making the decision.

These six categories of decision requirements became the column headers in the DRT framework. Each was defined in the framework, and examples were provided. In addition, we constructed a completed, or master, framework to identify the particular dilemmas, cues, factors, decisions, common errors and job knowledge intended for participants to report, as well as the performance area represented. The master DRT framework was adapted from the original *Engagement at Jafarani* scenario materials, which included a DRT derived from CTA interviews with highly skilled squad leaders.

We drafted the question sets at each segment break to elicit the response types that would populate the DRT framework, using terminology that would be easily understood by the target population. The questions were sequenced to support the construction of the DRT during the course of the interview. For example, participants are asked to first identify the dilemmas or problems related to the tactical situation, then the cues and factors they will use to resolve the dilemma or problem, what COA they will pursue, how other squad leaders might make mistakes in handling the dilemma, and what job knowledge they used to resolve the dilemma.

Phase 3: Review, Revision, and Usability Testing

An in-house SME reviewed the scenario and modified it for tactical and technical accuracy, proper terminology, and clarity to an audience of Sergeants. He then modified the master DRT framework to reflect his scenario revisions.

The DRI will be subjected to usability testing with six Sergeants representing the target audience. The protocol will be administered to judge the clarity of the scenario and question sets, the protocol's ability to elicit the desired elements of cognitive performance and decision considerations, and the researchers' ability to construct the DRT during the course of an interview. Following usability testing, the scenario, question sets, and DRT framework will be modified as needed to increase the utility and ease of use of the DRI as a performance-based measure of decision making.

Results and Discussion

A version of the Initial SUDM Assessment Battery (Ross, Vogel-Walcutt, & Phillips, 2012) was created from the literature review and the custom instruments (BARS, SJT, and DRI). It contains 27 instruments addressing 15 of the 17 constructs (excepting anomaly detection and change detection, still under investigation). This version is subject to usability testing of the SJT and the DRI to be carried out under Option 1 of the contract. Furthermore, it will be assessed during the conduct of a pilot study and modified according to pilot study findings.

Following usability testing of the SJT and DRI instruments and instrument revision, the pilot study will commence. The study will consist of five administrations of the battery as well as completion of subjective surveys by participants and their supervisors. The administrations will be conducted prior to the cohort of students entering their Advanced Infantry Courses, prior to entry into the new Infantry Small Unit Leader Course (ISULC), at the conclusion of ISULC, 6 months after assignment to a billet, and 12 months after assignment. The purpose of the data collection is to pilot test the battery. Simultaneously, battery development will continue as off-the-shelf measures are reduced in number, custom instruments are refined, and additional instruments are identified or developed to fill gaps or better address constructs than do initial instruments. Some changes to improve efficiency and effectiveness will be introduced during the pilot, but a core of measures will be maintained across the pilot administrations to insure consistent repeated measures to support validity of insights regarding development over time. Some changes in the battery resulting from analysis of the pilot data will be introduced only after the pilot is completed and the SUDM Assessment Battery is finalized.

Infantry Sergeants of varying levels of proficiency will complete the battery. Data gathered will be compared against hypothesized results. Instruments will be examined to determine if the results yield data that allow us to see differences in the group. The participant group is currently expected to be 21 Marines. Our hypothesis is that there will be differences within the group at each administration that allow us to infer differing stages of development. Across time, instruments that are measuring constructs we hypothesize should change due to training and experience will be examined for change in scores over time (e.g., adaptability and level of mastery). Instruments that do not discriminate among the participants or do not show changes over time when they are expected to do so will be considered for elimination. We expect other instruments related to constructs that may be considered traits not to show changes in scores over time. Some of the instruments selected were designed to measure traits. However, we may find that all of the constructs are amenable to change due to training and experience, and we must carefully examine the results to determine if changes are present and show trends that are valid.

Scales that conform to our hypotheses that the constructs represent traits that cannot be changed will be retained only if we believe they will have some predictive validity, i.e., identify potential good decision-makers in future psychometric analysis with a larger group. Scales demonstrating high correlations with other scales will be considered for elimination on the basis of repetition of the same underlying construct or inability to add value to the battery. In these cases, it is conceivable that whole constructs will be subsumed under others or eliminated from the set of as a result of these indications of construct similarity. Significant differences will be explored further to determine the underlying reasons for variations from expected outcomes to insure instruments conform to expectations or inform new conclusions for shaping the final battery. In addition, all instruments, but especially the DRI and BARS, will be examined for continual refinement to increase the ease of administration, and revised accordingly.

Once pilot testing is underway, we expect that additional gaps may emerge in the battery. For those areas where the currently available scales are too cumbersome, the results are not useful for informing training practices, or where no scale assesses the full scope of a construct, new, military-targeted scales may need to be developed and/or measures being developed under other efforts encompassing the constructs must be identified to fill the gaps.

We recommend that versions of the actual battery be restricted to official use by the research community only. Knowledge of the items which can be the subject of discussion among potential instructors and student participants in the subsequent pilot testing can invalidate the findings. Potential use of the scenarios in class by the instructors can also invalidate findings. Our research scenarios have become the subject of instruction in previous projects, and specific requests to retain the DRI and SJT scenarios for instruction have been made already during the course of this project, making this a realistic threat to validity.

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Appendix A: Operationalized Definitions and Examples of SUDM Competencies and CARS

Competency	Enabling CARS	Definition	Example
Sensemaking		The cognitive process, driven by a specific goal, of filtering information for relevancy and using it to construct and continually assess an explanation of the broad or specific situation, often in the form of a story, in order to understand how and why the situation evolved and anticipate what might happen next.	While patrolling through a field on the outskirts of a village, the squad took a suspected sniper round. The maneuver squad leader judged from the sound of the shot that it was a .303 round. He and the rest of the company had been tracking a highly skilled sniper who used a .303 and had been responsible for hitting and fatally wounding three Marines from the company. This sniper was considered highly skilled because he had deadly aim and always eluded capture. Therefore, the sniper was considered a high value target. The maneuver squad leader considered the sound of the shot to narrow down the sniper's position to a general area. Then, he conducted a perspective-taking activity to "flip the map" and visualize the terrain from the sniper's viewpoint to imagine what would be the best position for a sniper attack on the patrol. Because he knew this sniper was highly skilled, he crafted a mental story that the man would likely be positioned in the best possible location, one that offered concealment, cover, and excellent fields of fire. Based on his sensemaking and subsequent judgment of the sniper's location, he immediately ordered his squad members into covered positions that would protect them from the sniper, but also orient them to return fire and ultimately kill or capture the sniper. They successfully neutralized the sniper.
	Perspective Taking	Visualizing the situation from another's viewpoint and assessing his or her motivations and objectives, to predict his	The patrol was coming up upon a field with a series of compounds in the distance. The patrol's route had them crossing the field and headed toward the compounds. As he approached the field, the maneuver squad leader considered enemy TTP for the region and looked at the terrain to

Competency	Enabling CARS	Definition	Example
		or her future actions and proactively position for or take advantageous action.	identify the two or three potential positions from which the enemy may attack as the patrol crossed the field. This perspective taking activity supported decision making in that the maneuver squad leader was attuned to watching those positions more closely than others, and began to identify courses of action should the enemy actually attack from those positions.
	Analytical Reasoning	Critically and deliberately examining, assessing, and critiquing one or more alternatives or assumptions in the context of specified goals (e.g., the mission) and against a set of evaluative criteria (e.g., intent, timing, resources, or ROE).	The first maneuver squad leader in the platoon typically implemented a much greater dispersion between his fire teams when they moved in formation than was unit SOP. He used an analysis of the mission, terrain, enemy tactics, and squad capabilities to identify that a greater dispersion would make the squad more effective against the enemy. His mission had his squad conducting dismounted patrols through the open terrain of rural Afghanistan. The enemy tactics were to attack from a distance outside the range of rifle squad weapons, and then run away to avoid becoming decisively engaged with the Marines. The maneuver squad leader himself was senior and experienced, meaning he was capable of maintaining good command and control of his squad and coordinating effectively with his weapons teams to direct supporting fires. His fire team leaders were likewise strong and able to function autonomously with general tasking and intent from their leader. He reasoned that greater dispersion of the squad would enable better coverage and response to enemy attacks, without sacrificing the ability of the elements to be mutually supportive, even at those distances.

Competency	Enabling CARS	Definition	Example
	Anomaly Detection	Realizing through perceptual-cognitive processes that the presence or absence of elements or patterns of elements in the environment is off the baseline for that setting, and therefore requires more explicit reasoning to locate the source of the anomaly and understand its implications.	A squad took contact, and one of the fire teams became engaged with an unknown enemy. The fire team leader reported to the maneuver squad leader that they were engaged by enemy fighters who looked to be adult men. However, the engagement distance was far, so the fire team leader did not get a good look at the combatants. Soon after the squad broke contact, the maneuver squad leader and a team of Marines patrolled through a nearby village. As they rounded a corner in the village, they observed three young boys, approximately 12-16 years old, look at them then squat down to begin playing a dice game. The maneuver squad leader judged this behavior as an anomaly, because the boys didn't begin the game until they saw the Marines. He then engaged in a sensemaking activity to make sense of the anomaly. He crafted a mental story that these boys were following the enemy's common tactic of attacking Marines, and then attempting to blend in with the population. He reasoned that brought dice with them as part of their plan to appear normal and innocent. However, being young adults, they didn't realize that their sudden change of activity was an anomaly that drew suspicion. While the fire team leader reported that the enemy that engaged them were older adults, the maneuver squad leader could easily imagine a story where these three boys were responsible and attempting to cover their involvement. He immediately checked the boys for gunshot residue, and all three tested positive. He detained them.
	Change Detection	Attending to relevant aspects of the environment in order to perceive a	The squad was toward the end of a lengthy patrol. Upon retrograde back toward base, the maneuver squad leader recognized a change in the demeanor of the villagers they

Competency	Enabling CARS	Definition	Example
		difference in one or more elements in the situation, and interpreting that difference to support one's situational awareness, understanding of baseline, or immediate threat assessment.	had recently passed on their way out. The villagers were still milling about as they had been previously, but they had a tenseness about them that was different from the first time the patrol encountered them. The tenseness included them paying more attention to the Marines than they normally would; they were more focused on the Marines than usual. Typically the villagers would take note of the Marines but then go back to their business. In this case, they continued to keep an eye on the Marines, as if they were waiting to see the action that would ensue, with the Marines at the center of it. The maneuver squad leader interpreted this tenseness as an impending attack. He knew that the villagers were too intimidated by the insurgents to initiate a talk with or warn the Marines. He suspected they were hanging around to watch the attack they knew was coming. And his suspicion was correct; the patrol came under fire from the far side of the village.
	Situational Assessment	Analytically or intuitively identifying and collecting information from multiple available sources, including one's own knowledge, to analyze relevant factors of METT-TC and construct an understanding of the situation to support a specific task or goal.	As part of a company-sized operation in Fallujah, a squad was moving in formation through the hostile city with a sister squad to one flank, but no friendlies on the other flank. The platoon was beginning to encounter resistance in the form of small arms fire. One Marine had fallen out because he was shot, and was now lying in the middle of the street to the squad's rear. The maneuver squad leader, who was nearest to him, went back to retrieve him while the rest of the patrol halted in covered positions. As the maneuver squad leader began talking to the injured Marine to assess his injury, the Marine held his index finger to his lips as a signal to "shhh, be quiet." The maneuver squad leader listened and heard, from the other side of the courtyard wall

Competency	Enabling CARS	Definition	Example
			2 meters to his left, the sound of guys changing magazines. He now knew the enemy's position, and he had a sense of the brief window of time available to act. He knew he had to immediately pull the much larger Marine to safety before the hostiles re-engaged. That meant he would have to do it himself rather than his first instinct, which was to call for other Marines to help carry the wounded Marine out of the street. He dragged the Marine to a covered position, but as he was doing so, he himself took some shrapnel from a grenade underneath his flak jacket, on the shoulder. Because he was in pain, he forced the Marine to help him by scooting himself with his good leg while the maneuver squad leader pulled him to safety.
Adaptability		Fluidly modifying or changing one's planned actions when the situation has changed from what was expected, or when the typical approach or plan is rendered less effective than necessary.	A prisoner was inadvertently released, and a maneuver squad leader was given the task to capture and re-detain the man, and bring him back to the detention facility. The maneuver squad leader had detained several prisoners in the past and was familiar with how to snatch a wanted man from a residence, flex-cuff him, and load him into a vehicle to transport him to the FOB. However, as the squad approached the man's residence, it became apparent that the village was throwing a huge party to celebrate the man's release. Over a hundred friends and family members were in or around the residence, celebrating with the man. The maneuver squad leader quickly assessed that a hostile detention of the man would backfire on him—his squad was vastly outnumbered which would encourage the villagers to revolt, and he and his Marines would be forced to apply deadly force to protect themselves. Instead of using the typical and planned approach to detaining a man, the

Competency	Enabling CARS	Definition	Example
			MANEUVER SQUAD LEADER instead came up with a non-hostile ruse to get him into his custody. He told the man that the paperwork for his release had been improperly completed, and his signature was required back at the prison. He requested politely and apologetically that the man come with him to sort out the mess, and then he would return him to his home. The man put up no resistance and gladly went with the squad to further cement his release. The maneuver squad leader's adaptability prevented a skirmish and what would have been harmful second and third order effects.
	Situational Assessment	Analytically or intuitively identifying and collecting information from multiple available sources, including one's own knowledge, to analyze relevant factors of METT-TC and construct an understanding of the situation to support a specific task or goal.	Two squads were given a mission to conduct a raid on a compound housing known opium distributors. The squads were to be helo-dropped into the middle of the village to conduct the raid mission. The maneuver squad leaders judged several challenges associated with the mission, but nevertheless worked with their platoon commander and platoon sergeant during planning to analyze the mission goals, the terrain of the village and surrounding the landing zone, the enemy capabilities and expected resistance, the civilian population in the village, and the friendly resources required. A plan was developed as a result of the mission analysis, which spanned approximately 48 hours. However, during the helo-transit to the drop site, the company commander called to say that the landing zone had been changed to a location 2 km north of the previously planned drop site. The squads had 15 minutes before they would touch down, and therefore only 15 minutes to reassess the situation and re-plan the sticky operation. The maneuver squad leaders had a solid understanding of the company and

Competency	Enabling CARS	Definition	Example
			platoon commanders' intent, and were able to adapt their planned actions to reach the objective based on a re-assessment of the terrain and enemy they would encounter as a result of the changed landing zone.
	Cognitive Flexibility	Applying knowledge and principles of tactics and leadership differentially based upon the unique demands of the situation. Applying knowledge learned in one context to multiple relevant contexts.	A dismounted squad was moving through an Iraqi city as part of a platoon-sized operation. It was a dirty little town, with concrete buildings, dirt roads, ruts and junk everywhere. They expected to encounter resistance. As they were traveling down an alleyway with the squad spread out, the maneuver squad leader recalled a lesson from maneuver squad leader school: the long axis of the kill zone coincides with the long axis of the target. He calculated that if they were to come upon an enemy machine gun position, it would be oriented down the alleyway. In the current formation, they were exposed and would be easily picked off. He immediately ordered the squad of ten Marines to split in two sections and travel down parallel roads to provide mutual support. He reasoned that splitting the squad would increase its survivability. As it turned out, the enemy did in fact have a machine gun positioned at the end of the alleyway, and by splitting the squad they were able to avoid being trapped and more effectively engage the enemy position.
	Ambiguity Tolerance	The ability to calmly withstand and operate within uncertain environments by delaying drawing a conclusion or making a decision, or by	The squad was tasked to form a blocking position for another squad's operation. While fulfilling this mission, the squad lost the antenna for the electronic counter measures while in transit and went back to an open field to look for and retrieve it. While searching in the field, they came under fire. They had no communications to call for help or even

Competency	Enabling CARS	Definition	Example
		making assessments and decisions in the face of uncertainty.	report their situation, and they were vulnerable in the wide open terrain. The maneuver squad leader did not know how many enemies were involved. He didn't want to move forward to engage them and kill them because he didn't have the ability to call in a casualty evacuation in case someone became injured. He calmly handled the situation. He directed his fire teams to bound back two teams at a time, with the third team suppressing the enemy while the others moved. Then he sent one of his fire team leaders with the backup, short distance radio to get close enough to the other squad to radio them for assistance. Eventually they were able to move into a wadi for cover, which expedited their egress.
Attentional Control		Activities related to maintaining a focus on mission completion despite distractors including stress, boredom, fatigue, and emotion.	The Battalion Gunner, with his crew, was visiting the FOB in Ramadi. After the visit, on their way out of the FOB, they had to cut across a float bridge. This time, the vehicles hit a pressure plate IED, and they lost comms with everybody except one maneuver squad leader, a Sergeant. The Sergeant became responsible for directing all the traffic to respond and help the Gunner's convoy, and communicating information as the middleman between the S3, the Battalion Commander, and the Gunner. This was a massive communication and coordination piece for the maneuver squad leader, and he was stressed out about it. He coordinated a ground medevac for them. He knew where the Gunner was located from his first comm with him, and he could see them on the G-Boss. Instead of waiting for a 9-line from the Gunner's vehicles, he immediately launched 4 gun trucks from the FOB as the medevac. He prioritized that, since he knew where they were and knew what

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			assistance they needed, he could use gun trucks and get the medevac spun up immediately. The 9-line could be sent later. The medevac reached the Gunner within 5 minutes. The maneuver squad leader also called in two supporting units to come in and cordon off the area, and directed their strategic positioning as blocking positions based on his knowledge of the terrain right outside the FOB. In all, he managed and juggled 5 radio nets. "Because I was under stress, I was just making really good decisions." He managed the flood of information, made the right decisions as to where to set up the blocking positions, and was able to communicate situation updates back and forth between the Gunner and the S3 and Battalion Commander. After the event, "…my company commander said he couldn't have done things that day that I did. He was like, "Where the hell did that come from?" I was like, 'Dude, I don't know, I was stressed out and I was just in the zone.'"
	Resilience	Overcoming the stress, fatigue, emotion, or pain associated with a current or past event or situation in order to maintain or return to effectiveness as a leader and decision maker.	A maneuver squad leader was injured in a firefight in a city in Iraq. Because no vehicle could fit through the alleys, the casualty evacuation took the form of dismounted reinforcement Marines and stretchers for those who needed them. The reinforced unit would then bound back and out of the city to safety. The maneuver squad leader's injuries were bad enough that a stretcher was called for. However, he knew that if he got on a stretcher, it would require two Marines to carry him, and that would take two Marines out of the fight on the way out of the city. To set an example of mental toughness, and to maximize the employment of his Marines, he refused to be carried on a stretcher and instead walked on his own as the unit moved out of the city. This

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			maneuver squad leader continued to lead his squad through the firefight even after sustaining the injury.
	Self-Regulation	Monitoring, assessing, and adjusting one's own behavior and its effects in order to impact the situation in a way that supports mission, unit, or training goals.	A platoon sergeant was involved in a major firefight in Fallujah, where he was operating with one of the squads. During the operation he was hit with shrapnel from a grenade blast and experienced substantial bleeding. While the corpsman was treating him in the middle of the city, he noticed two of the younger Marines watching him with wide eyes, their faces growing white. He assessed that they were terrified that their platoon sergeant, who is the most experienced and combat-wise member of the unit, was seriously injured and potentially combat ineffective. He therefore adjusted his behavior by making light of the situation: "Hey corpsman, did the shrapnel mess up any of my tattoos? I hope not – they were expensive!" The Marines immediately began laughing at his horribly misaligned priorities, and gained confidence that "Staff Sergeant must not be hurt too badly if he's worried about his tattoos!" After lightening the mood with his humor, he proceeded to give each Marine a very specific task, with clear direction, that would direct their attention to a small set of goals and allow them to feel they had a purpose as contributors to the fight. He regulated his behavior to use humor, despite the pain and stress, to keep the two Marines from shutting down from fear in the middle of the firefight.
Metacognition		Activities related to considering one's own thought processes, including assessments of	Marines who are newly billeted as maneuver squad leaders go through a series of realizations about what it takes to be a maneuver squad leader, and how they will need to adjust their thought processes and behaviors to do the job. One of

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		strengths and limitations or developmental needs, in support of performing or learning the job.	the early realizations, especially challenging for Marines who are promoted to the billet within their current platoon, is that they must think and act like a leader instead of a peer. They can no longer be drinking buddies with their Marines. They can no longer go home on the weekends and hang out with their high school friends. They must separate themselves so that they can effectively manage the welfare of the squad. Another realization is that they must shift from focusing on themselves and their own performance, to focusing on their Marines and the squad's performance. Eventually another shift of focus occurs, from focusing on the squad actions in combat to focusing on the enemy's activities, in order to anticipate and stay a step ahead of the enemy at all times.
	Self-Awareness	Conscious knowledge of one's own character, motives, knowledge base, and skill set in order to request information or assistance when the requirements of the situation call for capabilities beyond one's current abilities.	A Sergeant pulled from Security Forces was billeted as a rifle maneuver squad leader. He quickly came to realize that his tactical and technical proficiency was not on par with the other maneuver squad leaders in the platoon. He also realized that as a maneuver squad leader, he would be expected to train his Marines on weapons, equipment, and tactics. To gain their respect and trust, he would need to be more knowledgeable than they. So, he made concerted efforts to study manuals and tactical pubs, pull information and experience-based knowledge from his platoon sergeant and trusted peers, and learn all he could from every training experience he encountered.
Problem Solving		Identification, definition, examination, prioritization, and	A dismounted squad was in a firefight in Fallujah. They'd taken three casualties, and had become holed up in an Iraqi residence they turned into their casualty collection point.

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		resolution of situations that impede task or mission accomplishment.	They had captured three insurgent fighters flex-cuffed in one room under security and women and children cordoned off in a separate room at the back of the house, also under security. They'd split the squad, with a team on the roof in an overwatch position pulling 360 degree security, and another team on the ground floor. There was fighting outside all around them. They had lost comms because of the structures in the city and the dense urban jungle. A couple members of a CAAT team had come to their aid, with a corpsman in tow, when they heard the shots break out. The maneuver squad leader knew they had a problem – they needed to get out and get help quickly, get care for their wounded, and ensure they wouldn't become overwhelmed by the enemy, who had much greater numbers. Even though he was outranked by his platoon sergeant who was also with the squad, he took charge and came up with a plan. He took out his GPS, stuck it in his platoon sergeant's face, and said, "Hey, I know where we are, I'm going to go get some help." He continued, saying the Marines from the CAAT team knew the position of their vehicles, and he could bound back to the vehicles with them and call for help from there. In this situation, it was a brilliantly reasoned solution to the problem. Once security was posted, the platoon sergeant gave the order to execute. The plan worked, and the squad was able to be extracted successfully from their position.
	Analytical Reasoning	Critically and deliberating examining, assessing, and critiquing one or more alternatives or	A squad was tasked with an operation to detain an individual in downtown Ramadi. The platoon commander, platoon sergeant, and maneuver squad leader all believed they knew where the man was located, based on the

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		assumptions in the context of specified goals (e.g., the mission) and against a set of evaluative criteria (e.g., intent, timing, resources, or ROE).	actionable intelligence they'd received. But, when the squad went into the house and checked the residents' ID cards, they quickly realized they were in the wrong house. The maneuver squad leader was immediately upset with himself for thinking to plan for several other contingencies, but not the simple contingency of what to do if he ended up at the wrong house. During the planning sessions, since he had external agencies working with him, he had focused his attention on what he wanted to task them to do, what he wanted his squad's security posture to be, and so forth. He didn't think about the "what if it's the wrong house?" He didn't have, as he called it, a brush-off plan. Once he realized he was in the wrong house, he knew he had a problem he needed to resolve – smoothing over the situation with the family. The squad hadn't destroyed anything in the house. The maneuver squad leader was civil, apologized to them, and asked if they needed any water. Then he gave them a case of water off one of the Humvees. That became the improvised brush-off plan. Next, he had to analyze what he knew about the target from the planning. He reasoned that they knew they were in the vicinity of the target, so he had to be in one of the residences nearby. He made the decision to go to the house on the right, and then the house on the left, and proceed out from there until they found him. As it turned out, the wanted man was in the house on the left – the third residence they entered.